

fusible, and they are able to dissolve silica and also protoxide of iron, and in addition a quantity of other substances in varying amounts which depend on the temperature. Each new substance taken up alters the melting point, the degree of fusibility and the solubility of the slag for other substances, and owing to this originates such an abundance of compounds that the survey of this province is rendered difficult, if not almost impossible. The easy receptivity of iron silicates for other substances fixes the character which the slag takes under the influence of the furnace structure. With acid linings the furnace must produce a slag with an excess of acids, whilst with basic linings bases must predominate. The plainest example of the formation of slag is furnished by heating or soaking furnaces for charges for rolling or forging. Ingots in rolling-mill furnaces, by way of example, cover themselves soon after being charged with a film of scale, from which pieces fall off and reach the hearth of the furnace, which consists of sand. On turning over the ingots, at sufficiently high temperature there thus results the union of iron scale and sand into a liquid iron silicate, which dissolves further scale, and with this spreads out on to the bottom of the furnace. Hence the slag comes into contact with fresh silica, which it takes up, whereby it acquires the capability of dissolving further scale. In this manner the slagging by scale is in progress on the entire bottom of the furnace in zones in which it is not too cold in order to allow the combination of solid scale with solid silicic acid to take place direct. Thus the entire scale which reaches the bottom is dissolved, and the fluid slag at temperatures under $1/200^{\circ}$ is able to be drawn off from the furnace almost like water, whilst the ingots are not far removed from their melting point. The heating- or soaking-furnace slag is in the main iron silicate. It contains 28 to 85 per cent. SiO_2 , in addition to 48 to 50 per cent. Fe in combination with oxygen and small amounts of other substances, such as MnO from the charge or such as Al_2O_3 , CaO and MgO, which come from the furnace structure. The complete analysis of such a slag showed 83 per cent $\text{SiO}_2 + 57$ per cent. $\text{FeO} + 9.5$ per cent. $\text{Al}_2\text{O}_3 + 0.7$ per cent. MnO.